

The Cellular Level of Organization

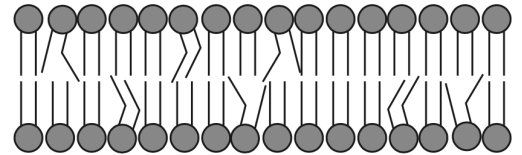
1. The Cell

A. Cell

B. Cell Types

i. Eukaryotic Cells

- Phospholipid Bilayer
 - * Hydrophilic



ii. Prokaryotic Cells

2. Plasma (cell) Membrane

- * Hydrophobic



- Cholesterol

A. Proteins

i. Integral Proteins

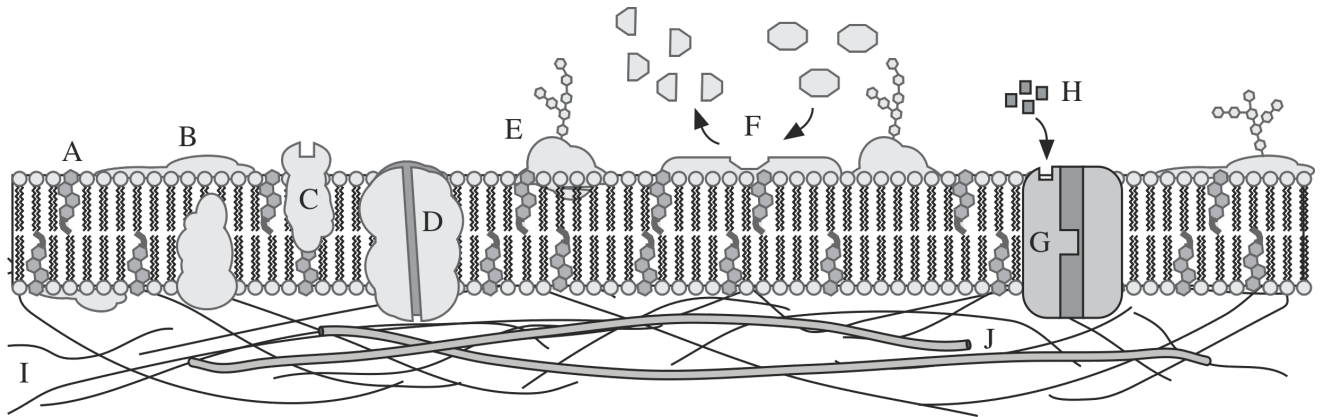
- a. Enzymes
- b. Transporters

ii. Peripheral Proteins

- a. Enzymes
- b. Cytoskeleton

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- | | |
|----|--|
| A. | Cholesterol |
| B. | Peripheral Protein |
| C. | Receptor |
| D. | Transporter (Carrier Molecule) |
| E. | Glycoprotein (ie., Major Histocompatibility Complex) |
| F. | Enzyme |
| G. | Transporter with “Gate” |
| H. | Hormone |
| I. | Peripheral proteins of Cytoskeleton |
| J. | Microtubules |

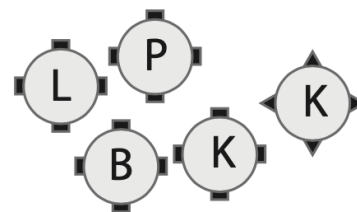


iii. Glycoproteins

a. Major Histocompatibility Complex



b. Antigen



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B. Cell Membrane Physiology

i. Facilitates Contact (see diagram in text)

a. Tight Junctions

- Interlocking Junctional Proteins

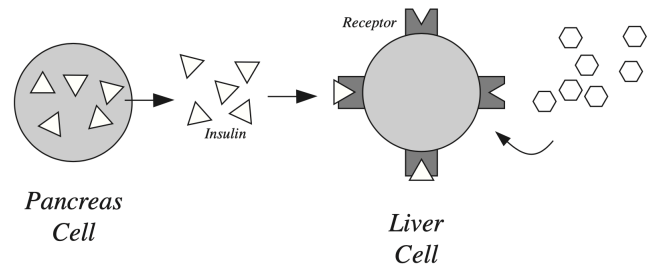
b. Desmosomes

- Interlocking Junctional Proteins
- Cytoskeleton

c. Gap Junctions

- Intercellular Communication

ii. Provides Receptors



- Enzymatic Functions

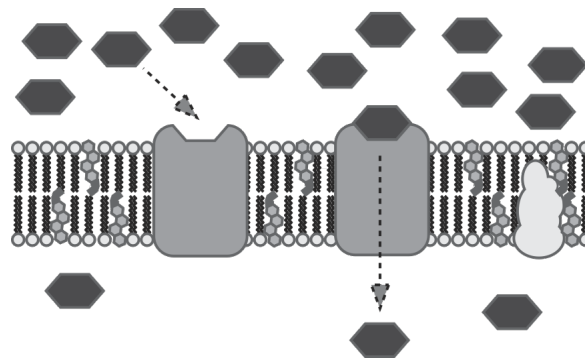
iii. Monitors

- Selective Permeability

Size

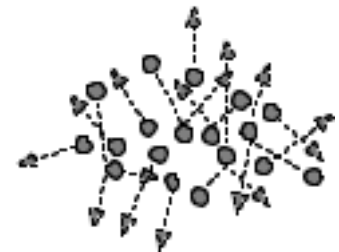
a. Solubility in Lipids

b. Carrier Molecules



C. Transport Across the membrane

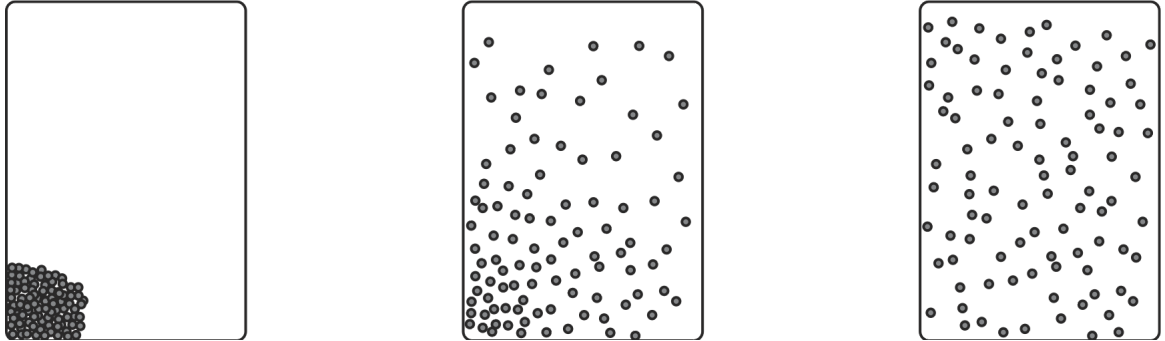
i. Passive Transport



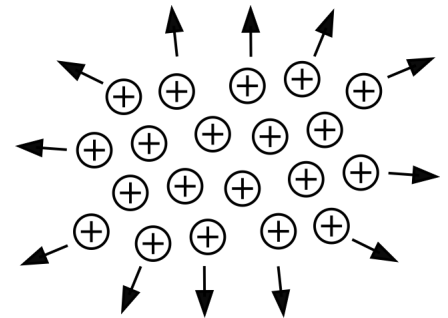
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a. Simple Diffusion

- Diffusion Gradient



- Electro-Chemical Gradient



b. Facilitated Diffusion

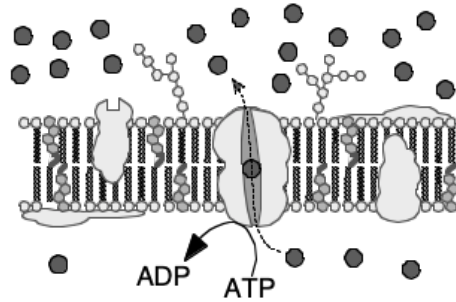
- Concentration Gradient
- Amount of Carrier (Transporters)

c. Osmosis (See Handout on Osmosis)

- Osmotic Pressure
- Isotonic Solution
- Hypotonic Solution
 - * (Hemolysis)
- Hypertonic Solution
 - * (Crenation)

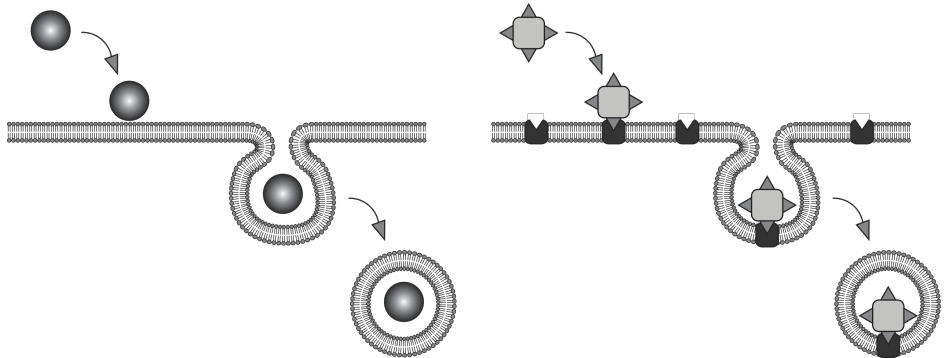
ii. Active Transport

a. Active Transport Transporters (Carrier Molecules)



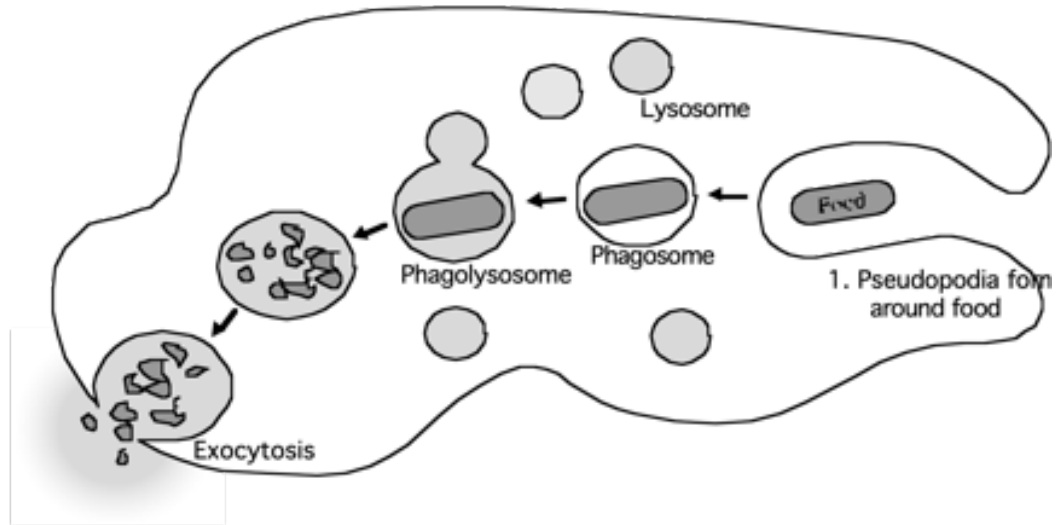
b. Endocytosis

c. Receptor-Mediated Endocytosis



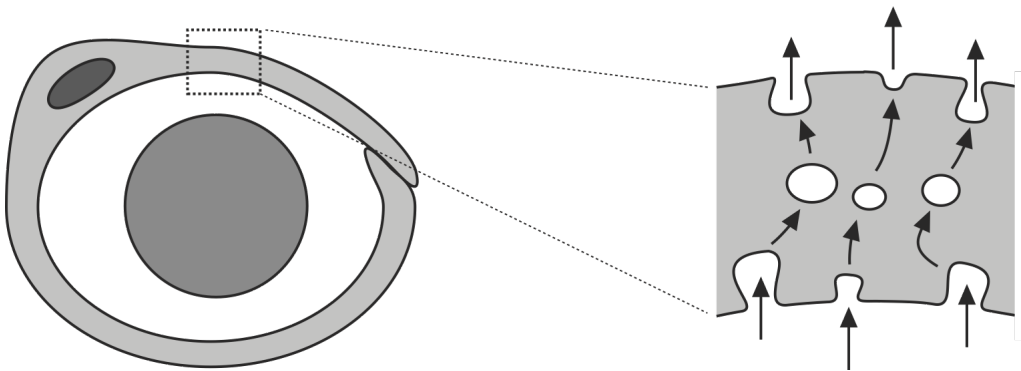
d. Phagocytosis

- Chemoattractants
- Negative Chemotaxis
- Positive Chemotaxis
- Pseudopodia
- Phagosome
- Exocytosis



f. Pinocytosis

- Pinocytic Vesicle



3. Cytoplasm

4. Organelles

A. Nucleus

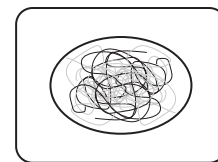
i. Nuclear Membrane

a. Pores

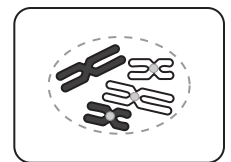
Nucleoplasm

b. Genetic Material

- Chromatin
- Chromosomes



DNA
in *Chromatin* Form



DNA
in *Chromosome* Form

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ii. Gene Action (PULL OUT HANDOUT ON PROTEIN SYNTHESIS)

a. Protein Syntheses

- Structural
- Metabolic
- Others

b. Enzymatic

c. Transcription and Translation

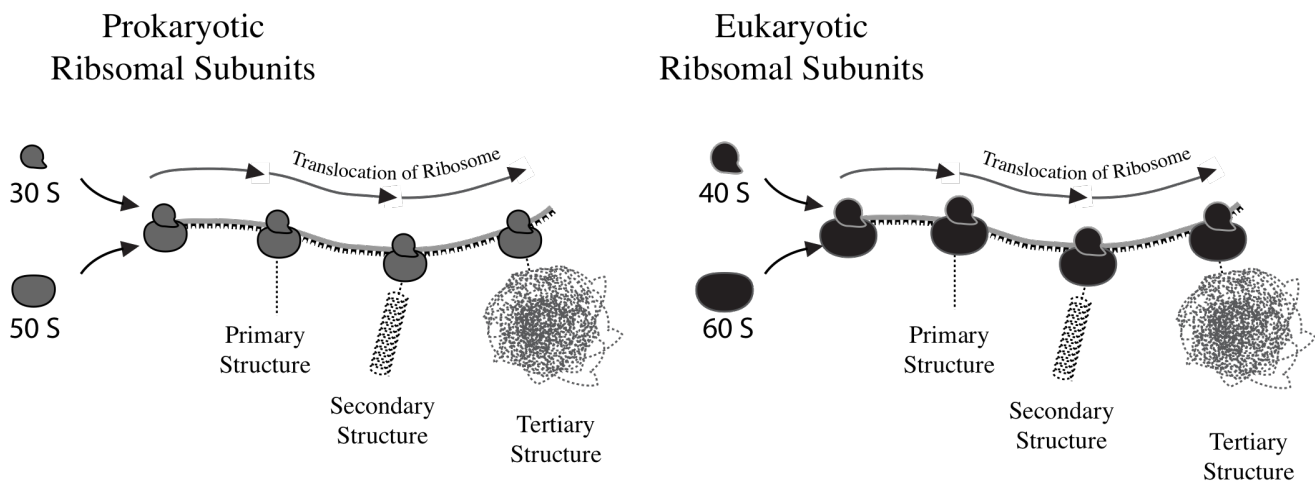


B. Ribosomes

Ribosomal RNA (rRNS)

i. Free Ribosomes

a. Small and Large Ribosomal Subunits



C. Endoplasmic Reticulum (ER) (Pull out handout)

i. Agranular (Smooth) ER

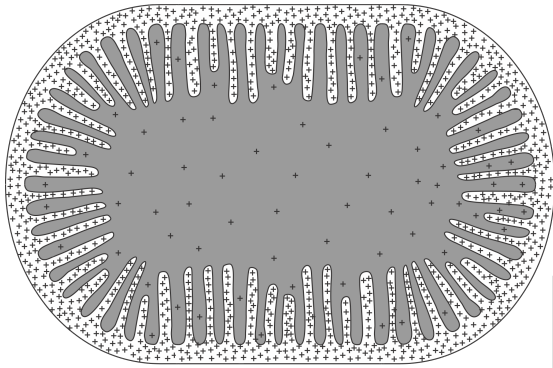
ii. Granular (Rough) ER

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D. Golgi Complex

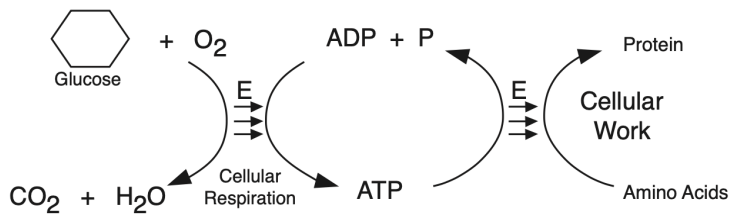
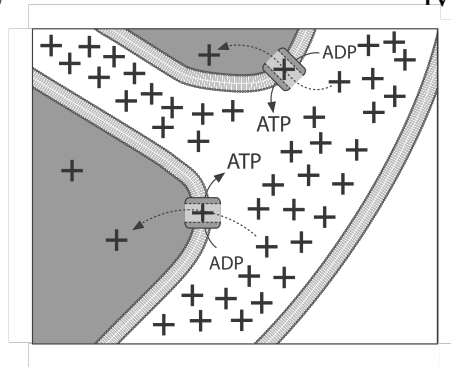
i. Cisternae

- Secretory Vesicles
- Transitional Vesicles
- Secretory Granules
- Exocytosis



E. Mitochondria

- Membranes
- Intermembrane Space
- Electrochemical Gradient
- Cellular Respiration



F. Lysosomes

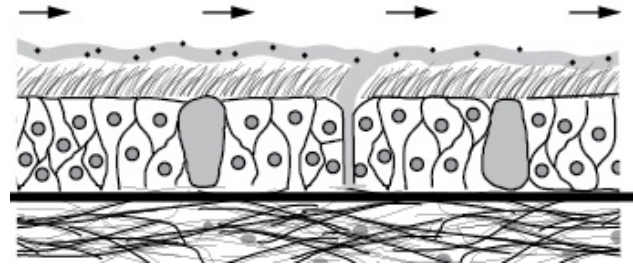
- Phagocytosis
- Apoptosis
- Bone Reabsorption

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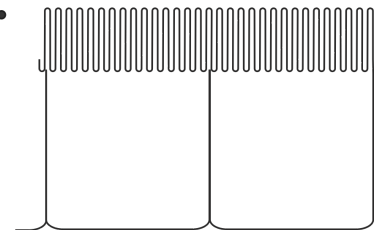
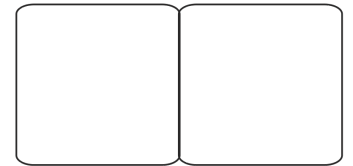
- H. The Cytoskeleton
 - i. Microtubules
 - a. Functions



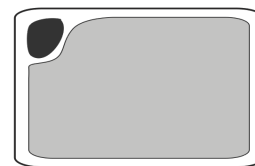
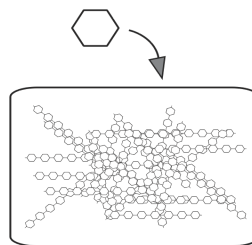
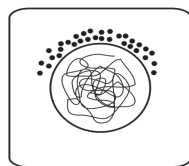
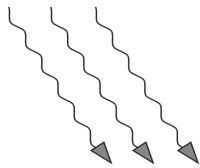
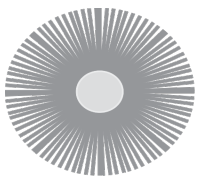
- I. Flagella and Cilia
 - i. Flagella
 - ii. Cilia



- J. Microvilli
 - a. Function



- 5. Cell Inclusions
 - A. Melanin
 - B. Glycogen
 - C. Lipids



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6. Growth and Developmental Processes

A. Cell Division

- i. Mitosis (see handout on mitosis for details)
- ii. Cytokinesis

B. Apoptosis

- Necrosis